DAMPAK REFORMASI ADMINISTRASI PERPAJAKAN INDONESIA KEPADA KEPATUHAN DAN PENERIMAAN PAJAK[1]

THE IMPACT OF THE INDONESIAN TAX ADMINISTRATION REFORM ON TAX COMPLIANCE AND TAX REVENUE

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Abstract

This study investigated the impact of the Indonesian tax administration reform on tax compliance and tax revenue. This study employs provincial-level data obtained from two main sources: Directorate General of Taxes (DGT) and Indonesia Statistic, and I applied multiple regressions with a fixed-effect model. The results show that individual taxpayer compliance was positively affected by the tax administration reform. Tax revenue, however, was negatively affected by the tax administration reform due to DGT's productivity problem meaning that tax potency did not affect tax revenue after the tax administration reform completed. The findings identify several areas for improvements and suggest several policy implications. First, improving administration in Small Taxpayer Office (STO) especially for individual taxpayers is needed. Second, tax revenue strategy focusing on individual taxpayers is required to materialize improvement in individual taxpayer compliance into tax revenue. Third, problems in productivity suggests that DGT should improve its input side by improving law enforcement, widening delegated authority, and increasing budget allocation.

Keywords: tax *reform, tax administration reform, tax compliance, tax revenue.*

JEL classification *codes: H20, H26, O23*

Abstrak

Penelitian ini menginvestigasi pengaruh dari reformasi administrasi perpajakan Indonesia kepada kepatuhan dan penerimaan pajak. Studi ini menggabungkan data pada level provinsi yang bersumber dari Direktorat Jenderal Pajak (DJP) dan Statistik Indonesia untuk kemudian diaplikasikan pada regresi berganda dengan model *fixed-effect*. Hasil penelitian menunjukkan bahwa reformasi administrasi perpajakan memberikan pengaruh positif pada kepatuhan wajib pajak orang pribadi. Namun demikian, reformasi administrasi perpajakan mempengaruhi penerimaan pajak secara negatif yang disebabkan karena permasalahan dalam produktivitas DJP dimana variabel potensi pajak tidak memengaruhi penerimaan pajak setelah reformasi selesai dilakukan. Hasil temuan dalam penelitian ini mengidentifikasi beberapa area yang perlu diperbaiki dan beberapa usulan kebijakan. Pertama, perlunya peningkatan administrasi perpajakan pada level KPP Pratama khususnya untuk wajib pajak orang pribadi. Kedua, strategi peningkatan penerimaan perlu difokuskan pada wajib pajak orang pribadi untuk merealisasikan peningkatan kepatuhan wajib pajak orang pribadi menjadi penerimaan pajak. Ketiga, permasalahan dalam produktivitas mengindikasikan bahwa DJP harus memperbaiki sisi input melalui peningkatan penegakan hukum, perluasan kewenangan, dan alokasi anggaran.

Kata kunci: reformasi pajak, reformasi administrasi perpajakan, kepatuhan pajak, penerimaan pajak.

Klasifikasi JEL: H20, H26, O23

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[1] The study is part of author's master thesis at National Graduate Institute for Policy Studies (GRIPS) Japan. The views expressed are my own.

INTRODUCTION

The role of tax administration in revenue collection is receiving more attention nowadays. Several countries implemented tax administration reform, which was generally assisted by the International Monetary Fund (IMF). Argentina overhauled its tax administration as a response to poor service and low compliance (Tanzi & Pellechio, 1995). Moreover, many African countries reformed their tax administration to simplify tax system and improve tax compliance (Silvani & Baer, 1997).

The government of Indonesia implemented a tax administration reform in 2002 by establishing Large Taxpayer Office (LTO), a special office for largest taxpayer nation-wide. After the establishment of LTO, the organizational structure of tax office was reorganized and consisted of two additional modernized tax offices: Medium Taxpayer Office (MTO) and Small Taxpayer Office (STO). The restructuring process was conducted gradually, and it was finally completed at the end of 2008.

The main question after the tax administration reform was completed is whether the reform was successful in increasing tax revenue. This is an important question because the performance of the DGT, the Indonesian tax authority, is mainly measured by the collection of tax revenue target. The Finance Minister of Indonesia said that the tax administration reform was successful by looking at a significant increase in tax revenue (Manggiasih, 2009). This argument seems to be plausible when we look at the increase in the nominal amount of collected tax revenue as shown in Figure 1. However, when we look at the relative amount measured by the ratio of tax revenue to Gross Domestic Product (GDP), Figure 1 shows a stagnant ratio, of around 12%, before and after the tax administration reform was completed at the end of 2008.

In addition, the tax administration reform was also intended to improve tax compliance to achieve state financial sustainability and stability (The DGT, 2007). Enhancing tax compliance and increasing tax revenue are two of the main success indicators of the tax administration reform. Therefore, it is important to empirically investigate whether the tax administration reform affects tax compliance as well as tax revenue.

Empirical research which statistically investigates the impact of tax administration reform on tax compliance and tax revenue is very limited. In Indonesia's case, Brondolo, Silvani, Borgne, and Bosch (2008) investigated Indonesian tax administration reform's effect on tax revenue and Foreign Direct Investment (FDI) using a macro-level statistical analysis. Brondolo et al. (2008) calculated the impact of the reform by calculating the difference between projected Value Added Tax (VAT) revenue and actual VAT revenue after controlling the change in economic structure. The projected VAT revenue was calculated based on nominal GDP and exemption rate assumption. To control the impact of the economic structure, Brondolo et al. (2008) calculated compliance rate (percent of potential VAT) for 2001 and assume that rate unchanged until 2006. The projected VAT, after controlling economic structure impact, then compare to the actual VAT revenue. Brondolo et al. (2008) argued that the remaining was the revenue that was affected by the tax administration reform.

Brondolo's et al. (2008), to my knowledge, suffer several methodology drawbacks. First, assuming the same exemption rate for all the year under investigation could bias the result since in the period of analysis (2001-2006) Indonesia amended several regulations that could affect the exemption rate. During the analysis period, for example, the Indonesia government amended Government Regulation Number 12 Year 2001 which regulate about strategic taxable goods that was exempted from VAT. Second, Brondolo's et al. (2008) using macro or nation-level analysis to investigate the reform's impact. This analysis contradicted to the fact that the reform was conducted gradually, for the period 2002-2003 the reform was focused on nation-wide tax office and finally from 2004 the reform started to be implemented from Jakarta region to other Indonesia territory. Third, assuming the same compliance rate through the year analysis could mislead the result since compliance rate variable is endogenous that could be affected by the reform itself.

This paper tries to address methodology problem in Brondolo's et al. (2008) using several measures. First, this paper used longer year analysis from 2003-2012. Since the modernization was completed at the end of 2008, this longer period enables this paper to compare the tax revenue before and after the completion of the tax administration reform. Second, this paper used provincial level data to represent the gradual implementation of the reform across province. Third, since this paper used provincial level data, the data could be constructed as panel data to control potential omitted variable using fixed effect instrument. Finally, this paper used regression analysis which could control other variables that affect tax revenue and focused on tax administration reform variable as a variable of interest.

LITERATURE REVIEW

There are several possible definitions of tax administration reform that could be used to make the terminology clearer. Tanzi and Pellechio (1995) emphasized tax administration reform as a measure to improve tax administrative efficiency and effectiveness. Moreover, tax administration reform also contained strategy related to tax compliance, where scarce resources should be allocated efficiently to detect and punish non-compliance while promoting compliance at the same time (Bergman, 2003; Bird, 2004; Brondolo et al., 2008). This paper, however, defines tax administration reform as a comprehensive strategy in reforming DGT's organizational structure, business process, human resource management, and good governance (The DGT, 2007).

Main Features of Tax Administration Reform

Execution of tax administrative reform generally involves improvements in organizational structure, human resources, taxpayer services, and law enforcement. Organizational structure, the first target of the reform, is integrated by transforming from tax type-based structure into function-based structure (Silvani & Baer, 1997; Tanzi & Pellechio, 1995). Restructuring is aimed to support the self-assessment system because function-based structure allows specialization of the work flow, improvement of management and control, better use of resources, and consistent services to taxpayers (Crandall & Bodin, 2005; Tanzi & Pellechio, 1995). In addition, organizational restructuring is usually followed by establishment of a new tax office, which administers large taxpayers (Silvani & Baer, 1997; Tanzi & Pellechio, 1995).

The second area to be reformed is human resources. Bird (2004) argued that adequate manpower is the most important, and he considered human resources as an important input when we view tax administration as a production process. Moreover, Tanzi and Pellechio (1995) considered the human resource was not only the quantity but also the quality. In addition, the improvement in human resources should be supported by a better incentive to deter corruption, and consequently it must also be followed by appropriate punishment system (Tanzi & Pellechio, 1995).

The success of self-assessment system will likely also depend on reform in taxpayer services (Silvani & Baer, 1997). Bird (2004) indicated the importance of this matter by stating that simplification of tax system was an important prerequisite for tax administration reform. Moreover, taxpayer service could also be found in education of the taxpayer, improvement in tax forms and betterment in communication channel between taxpayers and tax officers (Silvani & Baer, 1997; Tanzi & Pellechio, 1995). Silvani and Baer (1997) also argued that the effectiveness in performing tax services should be supported by modernization in information technology. The reason for technology involvement was that technology allows tax administration to upgrade information handling capacity and correct resource limitation problem (Bird, 2004).

The last common feature of tax administration reform is law enforcement. A well-designed tax system would be meaningless unless it is followed by sound law enforcement (Bird, 2004). Moreover, Tanzi and Pellechio (1995) translated the law enforcement into the improvement of audit coverage and application of adequate penalty. All in all, the implementation of tax administration reform is not only to reform organizational structures but also to improve human resources, taxpayer service, and law enforcement.

Tax Administration Reform, Tax Compliance and Tax Revenue

Tax administration reform increases tax revenue by improving the effectiveness of tax administration (Silvani & Baer, 1997). An indicator usually used to measure tax administration effectiveness is the tax gap (Silvani & Baer, 1997), which is defined as tax amount that should be paid based on tax law minus actual payment (Mazur & Plumley, 2007). Tanzi and Pellechio (1995) argued that the effectiveness of tax administration could be increased by controlling the tax gap, and consequently it would increase tax revenue. They believed that tax administration reform could achieve this purpose efficiently using limited administrative resources.

Tax administration reform can reduce the tax gap by enhancing taxpayer compliance (Das-Gupta, Ghosh, & Mookherjee, 2004). Taxpayer compliance could be increased by balancing between taxpayer services and taxpayer audit or enforcement to maximize tax collection at low administrative cost (Crandall & Bodin, 2005). Increasing taxpayer services by making tax payment easier for taxpayers, which is usually called compliance facilitation, could provide incentives for taxpayers to pay tax voluntarily (Brondolo et al., 2008). On the other hand, improving the taxpayer audit process, which is commonly called compliance enforcement, could benefit tax revenue directly by generating additional tax and indirectly by discouraging taxpayers from breaking the law (Brondolo et al., 2008).

Several studies examine the impact of tax administration reform by investigating the impact of large taxpayer office on tax revenue. The impact of this office varies among these studies. Silvani and Baer (1997) summarized the finding from several countries that tax revenue and taxpayer compliance increased after tax authority began to monitor large taxpayers by using a special unit. Similarly, Kloeden (2011) argued that the new approach of taxpayer segmentation in majority of Anglophone African country was considerably effective although the effect was small at the first stage of the implementation. However, Vehorn (2011) found a different result. Using dataset from 40 developed and developing countries, Vehorn (2011) calculated the statistical difference between the tax ratio before and after the establishment of a large taxpayer unit. He found that 17 countries (43%) recorded negative performance in the sense that the average tax ratio after the establishment of a large taxpayer unit is lower than before.

In Indonesia's case, Brondolo et al. (2008) studied the effect of the Indonesian tax administration reform on tax revenue. In this study, instead of investigating the reform's impact on all type of tax revenues, they investigated the reform's impact on VAT revenue using a national-level macroeconomics analysis. First, Brondolo et al. (2008) calculated the estimated VAT revenue from total nominal GDP using assumption in exemption rate and compliance rate. Second, the estimated VAT revenue derived from the first step was compared to the actual VAT revenue. They found that the actual VAT revenue (in relative amount to GDP) was higher than the estimated VAT revenue, and they concluded that the difference is due to the tax administration reform.

The Indonesian Tax Administration Reform

Indonesia first major tax reform was launched in 1983 when a series of new tax law were enacted. This reform marked a significant change in tax system from official assessment to self- assessment. The reform simplified several outdated tax types from the Dutch Colonial Government into four new tax: Income Tax, VAT and Sales Tax on Luxurious Goods, Land and Building Tax, and Stamp Duty (Rizal, 2011). This reform was motivated by the decrease of nonoil tax revenue to GDP ratio, weak law enforcement and compliance as well as inefficient allocation and inequities between individual taxpayers (Asher, 1997). The 1983 reform successfully increased the nonoil tax revenue to GDP ratio from 6% in 1983 to 8,9% in 1989 (Asher, 1997). The reform also improved the efficiency of tax administration by introducing new functional organization, tax appeal system, computer center and new management reporting system (Asher, 1997).

Similar backgrounds were also motivated the Indonesia tax administration reform. The reform was a part of the economic recovery program in generating sustainable revenue sources in the aftermath of the 1997 Asian Financial Crisis (Brondolo et al., 2008). The reform was also a respond to the low yield of the overall tax system, poor tax administration, weak enforcement and obsolete information system (Brondolo et al., 2008). In addition, there was also a pressure to promote good governance practice in the public sector (including DGT) after the fall of Soeharto regime (Rizal, 2011).

The Indonesian tax administration reform aimed to improve three important components: taxpayer compliance, public trust, and tax officer productivity (The DGT, 2007). To attain these goals, the tax administration reform should be designed comprehensively. The comprehensive strategy included four basic reforms in organizational structure, business process, human resource management, and good governance (The DGT, 2007).

In organizational structure, DGT combined three types of operational tax offices (Tax Service Office, Tax on Land and Building Service Office, and Tax Audit and Investigation Office) into a single tax office and adopted a functional tax-type organizational structure which consist of service function, supervision and consultation function, audit function, collection function, and data processing function (The DGT, 2007). In business process, DGT formalized the Standard Operating Procedure as well as simplified rule and procedure (Rizal, 2011; The DGT, 2007). Improvement in recruitment, training, transfer, evaluation, and promotion together with a new compensation scheme were an implementation of strategy in human resource management. Lastly, establishment of internal inspection body and code of conduct were an integral part of the good governance principle.

The real implementation of the tax administration reform was establishment of the LTO, MTO, and STO. LTO is a nation-wide tax office which administers the large taxpayer at the national level. The first LTO was established in 2002. MTO is a tax office which administers large taxpayers generally at the provincial level. The first MTO was established in Jakarta in 2004. STO is a tax office which administers the rest of the taxpayers who are not registered in MTO and LTO. The first STO was established in Jakarta in 2004. The tax office restructuring process (LTO, MTO, and STO) was completed at the end of 2008.

Considering that the Indonesian tax administration reform has been implemented for more than one decade, this paper attempts to empirically examine whether the reform improved tax compliance and tax revenue. This paper uses a provincial-level dataset, analyzes tax revenue comprehensively, and more importantly applies an appropriate econometrics analysis to address the problems that might exist in Brondolo et al. (2008).

DATA AND METHODOLOGY

This paper uses ordinary least squares multiple regression analysis. To investigate the impact of the Indonesian tax administration reform on tax compliance and tax revenue, I use the provincial-level data from 2003 to 2012. The analysis uses a fixed-effect model (province fixed-effect and year fixed-effect) to control for omitted variable bias and applies heterokedasticity and autocorrelation-consistent standard errors (HAC/clustered SE) to check robustness of the results.

Data

Data for this paper consist of two major data: tax related data and provincial macroeconomic indicator data. The tax related data is obtained from DGT. These data include tax revenue, the number of registered taxpayers, and the number of reported annual income tax return. Because the original tax related data are a tax office-level data, provincial-level data are obtained by aggregating the data from tax offices whose jurisdiction is in the same province.

The provincial-level macroeconomic indicators are obtained from Indonesia Statistics (various publications). These data include gross regional domestic product (GRDP), GRDP sectoral components and population.

Empirical Model for the Tax Administration Reform Effect on Tax Compliance

To investigate the impact of the tax administration reform on tax compliance, I estimate the following regression equations:

$$\mathrm{COR\_COMP}_{it} = \beta_0 + \beta_1 \mathrm{MTO}_{it} + \beta_2 \mathrm{STO}_{it} + \beta_3 \mathrm{lCOR}_{it} + \beta_4 \mathrm{lPCGRDP}_{it} + \beta_5 \mathrm{YRS}_{it} + \beta_6 Z_i + \beta_7 T_t + u_{it} \quad (1)$$

$$\mathrm{IND\_COMP}_{it} = \beta_0 + \beta_1 \mathrm{STO}_{it} + \beta_2 \mathrm{lIND}_{it} + \beta_3 \mathrm{lPCGRDP}_{it} + \beta_4 \mathrm{YRS}_{it} + \beta_5 Z_i + \beta_6 T_t + u_{it} \quad (2)$$

where

i: province

t: year

Zi: province fixed-effect

Tt: year fixed-effect

Dependent Variable

These estimations measure the impact of the tax administration reform on taxpayer compliance for both corporate taxpayer and individual taxpayer. COR_COMP and IND_COMP are tax compliance variables for corporate and individual taxpayers respectively. Organization for Economic Cooperation and Development (OECD) defines tax compliance as the degree of tax obligation fulfillment by taxpayers (OECD, 2004). In addition, article 3 of General Provisions and Tax Procedures Law states that filing tax return is one of the main obligations of every taxpayer. Based on this provision, the compliance variables in this paper are measured by the ratio of the number of reported income tax returns to the number of registered taxpayers for each corporate and individual taxpayer (income tax return filing rate).

Variables of Interest

MTO and STO are dummy variables for the development of the tax administration reform[1]. MTO equals to 1 if MTO has been established in particular province, otherwise equals zero. Similarly, STO equals to 1 if STO has been established in particular province, otherwise equals zero[2]. As previously explained, the Indonesian tax administration reform was mainly characterized by the establishment of the so-called modernized tax office, which replaced the old tax office organizational structure. MTO and STO are used as proxies for the tax administration reform because these modernized tax offices are expected to implement four basic reform strategies: organizational structure, business process, human resource management, and good governance. In organizational structure, these modernized tax offices implemented the function-based structure replacing the tax-type based structure. The business process strategy was implemented by the operation of the Standard Operating Procedures in these modernized tax offices. Moreover, the employees working in these modernized tax offices have been trained before, and they received a better salary, which represents new remuneration system. Lastly, the employees in these modernized tax offices signed the code of conduct as the implementation of good governance.

Control Variables

lIND and lCOR are variables that control the number of registered individual and corporate taxpayers, respectively (in natural log). As suggested by theoretical models constructed by Andreoni, Erard and Feinstein (1998), there is a relationship between income level and tax evasion. Therefore, I include per capita GRDP in natural log (lPCGRDP) as a proxy for average income in the province level. In addition, Andreoni, Erard and Feinstein (1998) also suggested that demographic factor is one of tax compliance determinant, therefore I use

[1] In this paper, LTO is not included as variable of interest because LTO's jurisdiction cannot be associated with specific province (LTO is a nation-wide office). Therefore, the effect of LTO cannot be linked to tax revenue of particular province. There are also several nation-wide MTOs that administer specific companies (foreign multinational company, oil and gas company, permanent establishment and publicly-listed company), and for the same reason with LTO, these tax offices are not included as variable of interest.

[2] MTO was not included in regression equation (2) because MTO does not administer individual taxpayers.

average year of schooling (YRS) as a proxy for demographic factor especially the education level.

Empirical Model for the Tax Administration Reform Effect on Tax Revenue

To investigate the impact of the tax administration reform on tax revenue, I estimate the following regression equation:

$$TR_{it} = \beta_0 + \beta_1 MTO_{it} + \beta_2 STO_{it} + \beta_3 lPCGRDP_{it} + \beta_4 lIND_{it} + \beta_5 IND\_COMP_{it} + \beta_6 lCOR_{it} + \beta_7 COR\_COMP_{it} + \beta_8 AG_{it} + \beta_9 MN_{it} + \beta_{10} MF_{it} + \beta_{11} EGW_{it} + \beta_{12} CO_{it} + \beta_{13} TRADE_{it} + \beta_{14} TC_{it} + \beta_{15} FRB_{it} + \beta_{16} SR_{it} + \beta_{17} OIL_{it} + \beta_{18} Z_i + \beta_{19} T_t + u_{it} \quad (3)$$

where

i: province

t: year

Zi: province fixed-effect

Tt: year fixed-effect

Dependent Variable

TR is the tax ratio defined as the ratio of tax revenue to GRDP[3].

Variables of Interest

MTO and STO are dummy variables for the development of the tax administration reform.

Control Variables[4]

lPCGRDP is per capita GRDP (in natural log), and it is a proxy for development in economy (Bird, Vazquez, & Torgler, 2004; Gupta, 2007). More specifically, Teera and Hudson (2004) argued that per capita income is an economic development indicator of income surplus for taxation purpose.

lIND and lCOR are the number of individual and corporate taxpayers, respectively (in natural log). The number of taxpayers might directly affect tax revenue because those taxpayers are registered in the tax administration system and become a subject to tax services, tax supervisions and law enforcements. Furthermore, IND_COMP and COR_COMP are tax compliance variables (measured in income tax return filing rate) for individual and corporate taxpayers respectively.

The rest of the control variables are controls for sectoral compositions of GRDP (GRDP by industrial origin). This paper uses 10 sectoral compositions of GRDP as follows[5]:

1. AG for agriculture share of GRDP
2. MN for mining share of GRDP
3. MF for manufacturing share of GRDP
4. EGW for electricity, gas, and water supply share of GRDP
5. CO for construction share of GRDP
6. TRADE for trade, hotel, and restaurant share of GRDP
7. TC for transportation and communication share of GRDP
8. FRB for finance, real estate, and business services share of GRDP
9. SR for services share of GRDP
10. OIL for oil and gas share of GRDP

The summary of variable definitions as well as the descriptive statistics are provided in Table 1 and Table 2 respectively.

RESULTS AND DISCUSSION

The Impact of the Tax Administration Reform on Tax Compliance

Table 3 presents the estimation results of equation (1) and (2). Column 1 and 2 show results for corporate taxpayer, and column 3 and 4 show results for individual taxpayer. For all results, both province fixed-effects and year fixed-effects are

[3] Tax revenue in TR is derived only from MTO and STO because the regression equation does not include LTO and other nation-wide tax offices.

[4] This paper does not control tax rate and tax base because both variables affect all provinces in the same effect. In other words, there was no variation in tax rate and tax base across provinces.

[5] Other studies used agriculture share to GDP for sectoral composition (Bird, Vazquez, & Torgler, 2004; Gupta, 2007; Le, Dodson, & Bayraktar, 2012; Piancastelli, 2001; Stotsky & WoldeMariam, 1997; Teera & Hudson, 2004). In addition to agriculture share, Piancastelli (2001) used industry share and service share, Stotsky and WoldeMariam (1997) used mining share and manufacturing share, and Teera and Hudson (2004) used manufacturing share.

included. Province fixed-effects control province fixed characteristics that are constant over time but different across provinces such as cultural perception on taxes. In addition, year fixed-effects control for time trend that was affected by, for example, nation-wide policies that affect all provinces but vary across time. For example, the global financial crisis in 2008 or the tax law amendment in 2009, which had nation-wide impact for all provinces, is controlled by the year fixed-effects.

Column 1 of Table 3 shows that the tax administration reform did not affect the corporate taxpayer compliance. Furthermore, as shown in column 2, the coefficients of STO and MTO are also not significant after including clustered standard error in the regression. In addition, the F-test shows that the coefficient of STO and MTO is not significantly different from zero meaning that the corporate taxpayer compliance was not affected by the tax administration reform. Since compliance is defined as the tax return filing rate, plausible reason for this insignificant result might be due to the steady growth of registered corporate taxpayers (see Figure 2), but the corporate income tax return grew in lower amount so that the corporate income tax return filing rate tend to slightly decreased over time (see Figure 3).

Column 3 and 4 of Table 3 provide results for the individual taxpayer compliance. In this column we can see that the coefficient of STO is positive and statistically significant even after including the clustered standard error. Therefore, we can conclude that the tax administration reform significantly affect the individual taxpayer compliance. The positive effect of the tax administration reform on individual taxpayer compliance might be due to rapid growth of registered individual taxpayer after the tax administration reform was completed (see Figure 2). That rapid growth was induced by improvement in registration procedure at modernized tax offices, and in the same time taxpayers are willing to report their tax return because filing procedure become easier and faster than before.

For other variables, Table 3 shows that the number of registered taxpayer and the level of income did not affect the taxpayer compliance. The education level, however, positively affect the individual taxpayer compliance. This finding seems plausible because we can expect that higher education level of the society will increase the individual taxpayer awareness in filing their tax return.

The Impact of the Tax Administration Reform on Tax Revenue

Main variables of interest

Table 4 provides the results of the regression equation (3) in two different regression equations. The first column, which will be explained in detail later, provides regression result without controlling tax compliance variables. The second column provides regression result with all control variables, fixed effect model and clustered standard error.

Based on the Table 4 column 2, both STO and MTO had significant negative effect on tax revenue. However, the regression result shows a different significant level: the coefficient on STO is significant at 5% significant level, but that on MTO is significant only at a 10% significant level. These findings suggest that the tax administration reform through establishment of MTO and STO decreased tax revenue (measured by tax ratio) by 0.8% and 0.4% respectively.

The negative result, to some extent, is consistent with Vehorn (2011). Vehorn (2011) investigated the impact of LTO on tax revenue performance in 40 countries. He measured the difference between 3-year average tax ratio before and after LTO establishment. The t-test shows that the difference was not significantly different from zero meaning the LTO's impact on revenue was limited. Furthermore, individual country evaluation indicated a negative revenue performance after LTO establishement in 17 countries.

The tax administration reform variable used in this paper is principally the same with Vehorn (2011). While this paper use MTO and STO as the proxy, Vehorn (2011) used LTO to represent the reform. The consistent finding indicated that there is a problem in the implementation of the reform. Vehorn (2011) argued that the problems were in simplicity, incremental change, and political will.

This paper, however, suggest different causes which will be explained further in the following paragraph.

The finding in this paper, however, contradict with Brondolo's et al (2008) finding. Brondolo's et al (2008) macro-level analysis found that VAT revenue to GDP ratio between period 2001-2006 should increase by 0.21 percentage point from 3.05% to 3.34%. However, during the period, the actual VAT to GDP ratio climb by 0.48 percentage point to 3.53% in 2006. They concluded that the 0.27 percentage point residual was due to DGT's tax administration reform. The significant difference in methodology is the most reasonable reason for the contradictory finding. While this paper using province-level panel data and longer year period of analysis, Brondolo et al. (2008) used a shorter range of national-level data as well as assumption in exemption rate and compliance rate.

To analyze the negative results of STO and MTO coefficient, I investigated the taxable income reported in income tax return over time. Figure 4 shows the non-nil income tax return ratio defined as a ratio of the number of income tax return with positive reported taxable income to the number of registered taxpayers. The non-nil income tax return ratio measures the proportion of registered taxpayers (individual and corporate) who pay tax indicated by positive taxable income. Figure 4 shows that the ratio decreased over time for both individual and corporate taxpayer which also means that the proportion of registered taxpayers who contribute to tax revenue decreased. Plausible reason for this condition was productivity problem meaning that DGT was unable to materialize tax potency into tax revenue. This productivity problem will be explained further in the next subsection.

The difference in significant level of STO and MTO signals that the possible problem in the Indonesian tax administration reform, without undermining the problem in MTO, is in STO. This difference suggests that the cause might due to the different characteristic between STO and MTO. The significant difference between these two offices is in the administration of individual taxpayers. Almost all individual taxpayers are administered in STO, and MTO only administers a small portion of the biggest corporate taxpayers, generally, in particular province. This administrative difference suggests another reason for the negative relationship between STO and tax revenue.

To analyze the negative result, this paper investigated the relationship between individual taxpayers and tax revenue in three different aspects: tax revenue contribution of individual taxpayers, individual taxpayer contribution compared with other taxes, and the development of registered individual taxpayers in relation to the number of tax officers. Figure 5 shows tax to GDP ratio for several types of taxes from 2005 to 2012. Figure 5 implies a decreasing trend of individual income tax ratio before and after the tax administration reform although there was one time increase in 2008 because of the sunset policy program, a tax penalty abolishment program for individual taxpayers who newly registered and amended their tax return. Comparing the contribution to other taxes, Figure 6 shows the contribution of individual income tax relative to other types of taxes from 2005 to 2012. From this figure, we can see that the contribution of individual tax revenue was relatively constant, at around 10%, before and after the tax administration reform. Then, Figure 2 shows the rapid increase of registered individual taxpayers especially after year 2007 when the tax administration reform was almost completed. However, as shown in Figure 7, the rapid increase in registered individual taxpayers was not followed by a sufficient increase in number of tax officers, and consequently the administration burden for each tax officer increased (measured by individual taxpayers to DGT employee ratio). On average, 1 officer handled only around 100 individual taxpayers in 2006 and significantly increased to handle more than 700 individual taxpayers in 2012. A problem with individual taxpayer administration in relation to human resource adequacy has been expressed by DGT's Director General since 2010 after the tax administration reform was completed (Jatmiko, 2014; Made, 2010).

Tax Administration Reform, Tax Compliance and Tax Revenue

This subsection discusses the impact of the tax administration reform on tax revenue in relation with the tax compliance. As suggested by Das-Gupta, Ghosh, and Mookherjee (2004), tax administration reform increases tax revenue by improving tax compliance. Moreover, tax administration reform also affects tax revenue by improving enforcement activities (Das-Gupta, Ghosh, and Mookherjee, 2004) and tax administration effectiveness (Silvani & Baer, 1997). To investigate the role of tax compliance, Table 4 column 1 provides regression result without controlling for tax compliance to measure the overall impact of the tax administration reform through all channels including tax compliance channel. As shown by the MTO and STO coefficients in column 1 and 2 of Table 4, the effect of STO and MTO does not change much indicating that taxpayer compliance might not affect the tax revenue. Then, by including tax compliance in regression equation, regression 2 confirms that tax compliance of corporate taxpayer (COR_COMP) and individual taxpayer (IND_COR) did not affect tax revenue. Reasonable reason behind all these results might be the definition of tax compliance used in this paper. Whereas other studies define tax compliance as the tax gap (Das-Gupta, Ghosh, & Mookherjee, 2004), this paper defines compliance as income tax returns filing rate (see Figure 3). In this case, the fact that compliance failed to affect tax revenue indicates that the additional increase in filed tax return might mainly come from non-revenue generated taxpayers such as individual salary workers whose income are already subject to withholding tax by employers.

DGT's productivity after the tax administration reform

Improving DGT's productivity is one of the main goals of the Indonesian tax administration reform (The DGT, 2007). Changes in organizational structure, business process, human resources, and governance are intended to improve DGT's capability in realizing tax potency into tax revenue. In the regression equations, tax potencies are embedded in taxpayer compliance, per capita income, and registered taxpayer variables. In addition, the negative coefficient of the tax administration reform variables suggests a problem in DGT's productivity to transform those tax potencies into tax revenue. Therefore, by constructing interaction term regression, I investigate how those tax potencies affect tax revenue after the tax administration reform was completed.

Table 5 provides the estimation results with the interaction terms variable between tax administration reform and three tax potency variables: taxpayer compliance, per capita income, and registered taxpayer variables. All specifications in Table 5 and the F-test indicate that all those interaction term coefficients are not significant. These results mean that taxpayer compliance, per capita income, and registered taxpayers did not affect tax revenue after the tax administration reform was completed. These findings are interesting because they signal a problem that after the tax administration reform was completed, DGT's productivity did not improve to materialize the tax potencies into tax revenue.

The productivity problem is more likely to be related with problem in input side when we consider tax administration as a production process. DGT needs a good input to transform tax base into tax revenue. In the preceding subsection, this paper has explained one of the input side problem related to the lack of human resources. Furthermore, in the subsequent paragraph, I will discuss and analyze other input problems including delegated authority, law enforcement and budget allocation.

Table 6 shows type of authority delegated to the tax authority in Indonesia and several selected countries. Surprisingly, only two out of nine of the tax administrative authorities are delegated to DGT. Comparing with other developing and OECD countries in the same table, it is clear that DGT's authorities are fall behind. Hence, this table shows that lack of delegated authority is one of the input problems in Indonesian tax administration.

Law enforcement is one of the key success factors in the implementation of self-assessment system. One indicator commonly used to measure the intensity of law enforcement activity is audit coverage ratio. Audit coverage ratio is calculated by dividing the number of completed verification (tax audit, assessment or similar enforcement mechanism) to the total number of registered taxpayers (individual and corporate taxpayer).

Figure 8 shows the audit coverage ratio for Indonesia and several selected countries. This figure implies that the Indonesia's audit coverage ratio for the year 2009 is 0.49% which is mean, on average, from 1000 registered taxpayers only 5 taxpayers are audited on that year. This ratio is the lowest among other developing and developed countries showed by the same figure and therefore suggests that low level of law enforcement is also a problem in the Indonesian tax administration.

Problems in tax audit suggested in this paper is also consistent with Brondolo et al. (2008). They argued that tax audit function is one of the weakest links among the DGT's enforcement programs. DGT faced difficulties in detecting major underreporting taxes and loss significant tax revenue. Therefore, Brondolo et al. (2008) recommend to put audit function in high priority to be reformed in medium term.

Other input factor that should also get attention is the amount of budget allocation to tax authorities. Figure 9 plots tax authority expenditure (in relative amount to GDP) at horizontal axis as a proxy for budget allocation and tax ratio at vertical axis. From this figure, Indonesian tax authority expenditure is around 0.053% of GDP which is very low compare to other middle and high-income countries. In addition, Figure 9 also implies a positive correlation between the tax administration expenditure and tax ratio.

CONCLUSION AND RECOMMENDATIONS

Tax administration reform is widely argued as a way to improve efficiency and effectiveness of tax administrations. However, the arguments proceed almost in absence of empirical evidence in the studies about the impact of the reform. This paper offers a better methodology to empirically investigate about the impact of the Indonesian tax administration reform on tax compliance and tax revenue.

The impact of the tax administration reform on tax compliance differ between taxpayers. For individual taxpayers, the finding indicates that the tax administration reform successfully increased the individual taxpayer compliance. For corporate taxpayers, however, the finding indicates that the tax administration reform did not increase the corporate taxpayer compliance.

Furthermore, the regression results also suggest that the establishment of MTO and STO had a negative and significant impact on tax revenue. The possible reason behind these results is the decrease in non-nil income tax return ratio due to the productivity problem that results a decrease in proportion of registered taxpayers who pay tax. The productivity problem means that tax revenue was not affected by the tax potency variables (taxpayer compliance, per capita income, and registered taxpayer variables) after the tax administration reform was completed. This finding is compelling because tax administration reform was initially designed to improve DGT's capability in materializing tax potency reflected in taxpayer compliance, per capita income, and registered taxpayer variables. Then, this finding suggests that DGT should improve its effectiveness in taxing taxpayers by improving its input side through improving law enforcement, widening delegated authority, and increasing budget allocation.

In addition, the difference in significant level of STO and MTO coefficient suggests that the negative impact might be due to problem in individual taxpayer administration. This reason seems to be plausible when we look at several indicators. First, income tax revenue from individual taxpayers, which is measured by its relative amount to GDP, decreased over time. Second, individual taxpayers' contribution to total tax revenue for period 2005 to 2012 was stagnant at around 10% of total tax revenue. Third, there was an increase in administration burden because the growth of individual taxpayer registration was much higher than the growth of DGT's human resources. In short, the results signify possible problem faced by DGT in the administration of individual taxpayers.

The negative results do not mean that the tax administration reform is meaningless, but the findings identify problems and areas for improvement. The findings suggest that improvement should start at STO especially regarding the administration of individual taxpayers. The findings also remind us about the importance of human resource quantity and quality in tax administration reform (Bird, 2004; Tanzi & Pellechio, 1995). However, increasing the number of employees alone might not solve the problems because it should be followed by a sound modernization in information technology that could enhance the employee's productivity (Bird, 2004; Silvani & Baer, 1997).

The problem in individual taxpayer administration and small contribution of individual tax revenue suggests an opportunity for improvement. Both facts indicate that DGT should start to focus its policy to improve DGT's capability in taxing individual taxpayers without undermining corporate taxpayers. This policy is not only important due to the fact that individual taxpayers contribute significantly in other countries but also the increasing needs to improve fiscal sustainability and government finance in the future.

By combining the findings in taxpayer compliance and tax revenue, I suggest several specific recommendations. The finding indicates that the tax administration reform successfully increased the individual taxpayer compliance but not sufficient to increase the tax revenue. This result implies that in formulating a strategy to improve tax revenue from individual taxpayers, DGT should focus on the supervision of registered individual taxpayers to transform the improvement of tax compliance into tax revenue. For corporate taxpayers, the finding indicates that the tax administration reform did not increase the corporate taxpayer compliance, and consequently it did not affect the tax revenue. This finding suggests that tax policy for corporate taxpayers should focus, for example, in expanding the tax base through extensification and enforcing the tax law for the non-compliance.

This paper uses MTO and STO as proxies for the development of the tax administration reform and excludes LTO due to the difficulty in linking the LTO's revenue to specific province. Given that this paper has already strived to mitigate that exclusion by including only MTO's and STO's revenue, future research might be needed to specifically investigate the impact of LTO. In addition, instead of using MTO and STO, future research may consider using other proxies for tax administration reform. Furthermore, using other definitions of tax compliance instead of income tax return filing rate might be also the subject for future research.

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Table 1. Variable Definitions

Variable Symbol	Variable Definition
TR	Tax revenue to gross regional domestic product ratio.
MTO	Equal to 1 for Medium Tax Office establishment, 0 otherwise. Author's main variable of interest.
STO	Equal to 1 for Small Tax Office establishment, 0 otherwise. Author's main variable of interest.
PCGRDP	Per capita gross regional domestic product. (see: Andreoni, Erard and Feinstein (1998))
COR	The number of registered corporate taxpayer
COR_COMP	Corporate taxpayer compliance measured by corporate income tax return filing rate (see: tax compliance definition by OECD (2004))
IND	The number of registered individual taxpayer
IND_COMP	Individual taxpayer compliance measured by individual income tax return filing rate (see: tax compliance definition by OECD (2004))
YRS	Year of schooling. Proxy for demographic factor. (see: Andreoni, Erard and Feinstein (1998))
AG MN MF EGW CO TRADE TC FRB SR OIL	Gross regional domestic product by industrial origin: agriculture (AG); mining (MN); manufacturing (MF); electricity, gas, and water supply (EGW); construction (CO); trade, hotel, and restaurant (TRADE); transportation and communication (TC); finance, real estate, and business services (FRB); services (SR); oil and gas (OIL). (see: Bird, Vazquez, & Torgler, 2004; Gupta, 2007; Le, Dodson, & Bayraktar, 2012; Piancastelli, 2001; Stotsky & WoldeMariam, 1997; Teera & Hudson, 2004)

Table 2. Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
TR	330	0.036	0.023	0.003	0.156
MTO	330	0.297	0.458	0.000	1.000
STO	330	0.470	0.500	0.000	1.000
PCGRDP*	330	17,529.650	18,366.740	2,296.277	112,002.700
COR	330	43,165.560	68,687.550	1,781.000	450,604.000
COR_COMP	330	0.325	0.119	0.045	0.836
IND	330	312,401.900	604,086.300	5,386.000	4,440,549.000
IND_COMP	330	0.355	0.147	0.003	1.030
YRS	330	7.791	0.945	5.800	10.950
AG	330	0.242	0.120	0.001	0.582
MN	330	0.111	0.151	0.000	0.716
MF	330	0.167	0.128	0.014	0.540
EGW	330	0.009	0.008	0.001	0.051
CO	330	0.059	0.030	0.012	0.182
TRADE	330	0.169	0.058	0.040	0.307
TC	330	0.074	0.029	0.018	0.159
FRB	330	0.053	0.046	0.008	0.318
SR	330	0.116	0.054	0.021	0.278
OIL	330	0.073	0.142	0.000	0.637

Source: Stata output
Note: *) In thousand of Rupiah

Table 3. The Impact of Tax Administration Reform on Tax Compliance

	(1)	(2)	(3)	(4)
VARIABLES	**COR_COMP**	**COR_COMP**	**IND_COMP**	**IND_COMP**
STO	-0.006	-0.006	0.143***	0.143***
	(0.022)	(0.023)	(0.034)	(0.040)
MTO	-0.021*	-0.021		
	(0.012)	(0.020)		
lIND			0.088***	0.088
			(0.031)	(0.060)
lCOR	-0.055	-0.055		
	(0.049)	(0.087)		
lPCGRDP	-0.027	-0.027	0.005	0.005
	(0.023)	(0.045)	(0.048)	(0.092)
YRS	0.009	0.009	0.083***	0.083*
	(0.019)	(0.027)	(0.031)	(0.048)
Constant	1.019*	1.019	-1.594**	-1.594
	(0.545)	(1.025)	(0.659)	(0.981)
F-test; p value in bracket				
STO=0 or MTO=0	1.88	1.59	-	-
	(0.155)	(0.220)		
Observations	330	330	330	330
Province Fixed-Effect	Yes	Yes	Yes	Yes
Year Fixed-Effect	Yes	Yes	Yes	Yes
Clustered Standard Error	No	Yes	No	Yes
Adj. R-squared	0.81	0.81	0.69	0.69

Source: Stata Output
Note: Robust standard errors are shown in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Table 4. The Impact of Tax Administration Reform on Tax Revenue

	(1)	(2)
	TR	**TR**
MTO	-0.007*	-0.008*
	(0.004)	(0.004)
STO	-0.007**	-0.004**
	(0.002)	(0.002)
lPCGRDP	-0.047**	-0.044**
	(0.021)	(0.020)
lIND	-0.013	-0.011
	(0.009)	(0.009)
IND_COMP		-0.015
		(0.013)
lCOR	0.040*	0.040*
	(0.020)	(0.020)
COR_COMP		0.016
		(0.022)
Constant	0.224	0.182
	(0.271)	(0.275)
F-Statistics (p-value):		
MTO, STO	3.83	4.05
	(0.032)	(0.027)
Observations	330	330
Sectoral GRDP Variable	Yes	Yes
Province Fixed Effect	Yes	Yes
Year Fixed Effect	Yes	Yes
Clustered SE	Yes	Yes
Adj. R-Squared	0.78	0.78

Source: Stata output
Note: Robust standard errors are shown in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.
All sectoral GRDP variables (AG, MN, MF, EGW, CO, TRADE, TC, FRB, SR and OIL) are included.

Table 5. The Tax Potencies' Effect on Tax Revenue after the Tax Administration Reform

	(1) TR	(2) TR	(3) TR
MTO	-0.014*	-0.027	0.010
	(0.008)	(0.042)	(0.024)
STO	-0.007	0.021	0.023
	(0.009)	(0.036)	(0.025)
STO_IND_COMP	0.009		
	(0.027)		
STO_COR_COMP	-0.004		
	(0.021)		
MTO_COR_COMP	0.016		
	(0.015)		
STO_lPCGRDP		-0.003	
		(0.004)	
MTO_lPCGRDP		0.002	
		(0.004)	
STO_lIND			-0.004
			(0.006)
STO_lCOR			0.002
			(0.008)
MTO_lCOR			-0.002
			(0.002)
Constant	0.175	0.151	0.209
	(0.273)	(0.285)	(0.265)
F-test; P-values in brackets			
STO_COR_COMP; and	0.54		
MTO_COR_COMP.	(0.590)		
STO_IND_COMP;	0.38		
STO_COR_COMP; and	(0.767)		
MTO_COR_COMP.			
STO_lPCGRDP; and		0.29	
MTO_lPCGRDP.		(0.753)	
STO_lCOR; and			0.24
MTO_lCOR.			(0.790)
STO_lIND;			1.8
STO_lCOR; and			(0.167)
MTO_lCOR.			
Observations	330	330	330
Control Variables	Yes	Yes	Yes
Province Fixed-Effect	Yes	Yes	Yes
Year Fixed-Effect	Yes	Yes	Yes
Clustered SE	Yes	Yes	Yes
Adj. R-squared	0.779	0.779	0.781

Source: Stata output
Note: Control variables are lPCGRDP, lIND, IND_COMP, lCOR, COR_COMP, and sectoral GRDP share.
Robust standard errors are shown in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 6. Delegated Authorities of Revenue Bodies from Selected Countries

Country	Make tax ruling	Remit penalties/ interest	Design internal structure	Allocate budget	Fix level/mix of staff	Set service standard	Influence staff recruitment criteria	Hire & dismiss staff	Negotiate staff pay levels
Indonesia	√	√	x	x	x	x	x	x	x
Argentina	√	x	√	√	√	√	√	√	√
China	√	√	√	√	√	√	√	√	x
Malaysia	√	√	√	√	x	√	√	√	√
India	√	√	√	x	√	√	√	√	x
Romania	√	x	x	√	x	√	√	√	x
South Africa	√	√	√	√	√	√	√	√	√
Singapore	√	√	√	√	√	√	√	√	√
Australia	√	√	√	√	√	√	√	√	√
Canada	√	√	√	√	√	√	√	√	√
Denmark	√	√	√	√	√	√	√	√	√
France	√	√	√	√	√	√	√	√	√
Germany	√	√	√	x	√	√	√	√	x
Japan	√	√	x	x	x	√	√	√	x
Korea, Rep.	√	√	√	√	x	√	√	√	√
United Kingdom	√	√	√	√	√	√	√	√	√
United States	√	√	√	√	√	√	√	√	√

Source: Based on data from OECD. (2010).

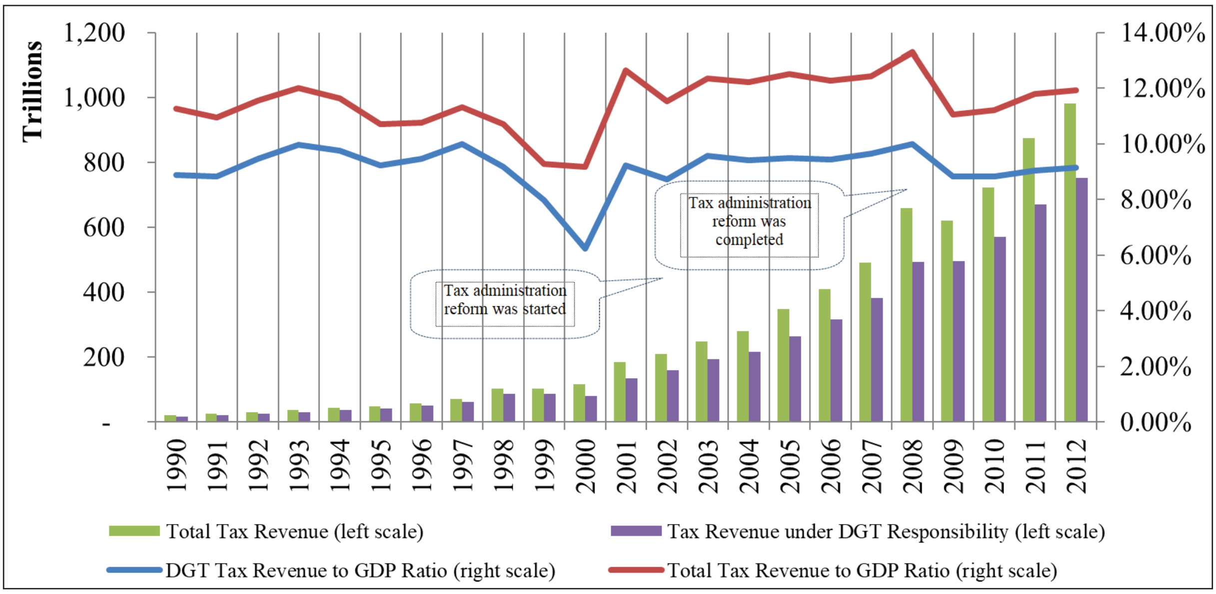

Figure 1. Tax revenue and tax to GDP ratio.

Source: The figure was based on data from Central Government Financial Report and Central Government Budget (various publications).

Note: Year 2000 was only for 9 months due to fiscal year change.

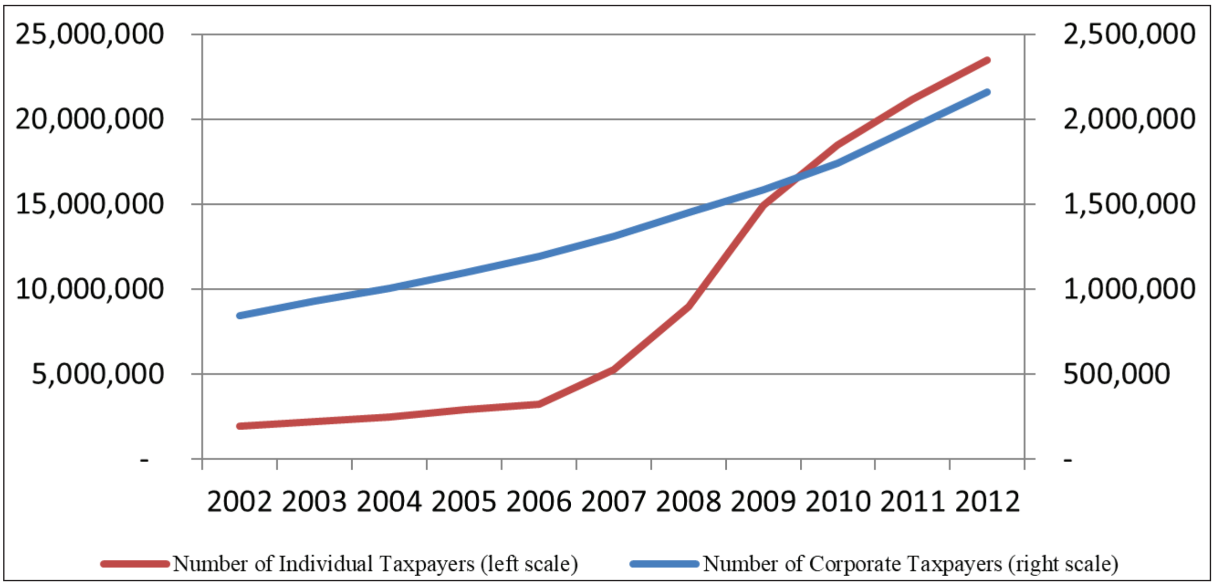

Figure 2. Trend of registered individual and corporate taxpayers.

Source: The figure was based on data from the Directorate General of Taxes.

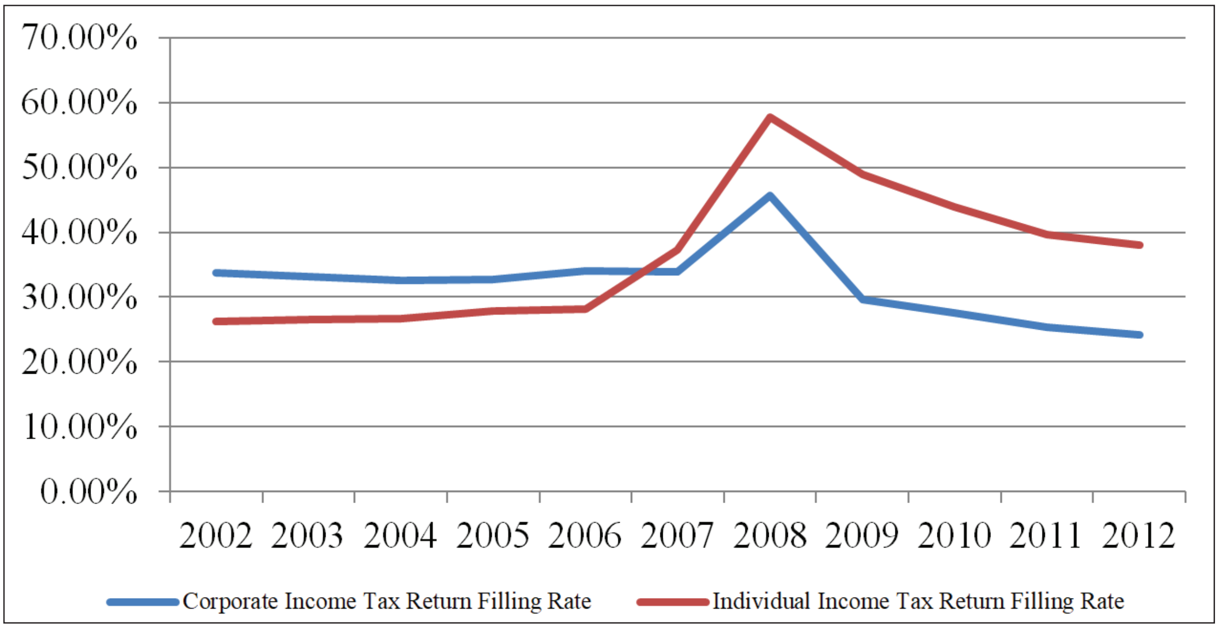

Figure 3. Individual and corporate income tax return filing rate.

Source: The figure was based on data from the Directorate General of Taxes.

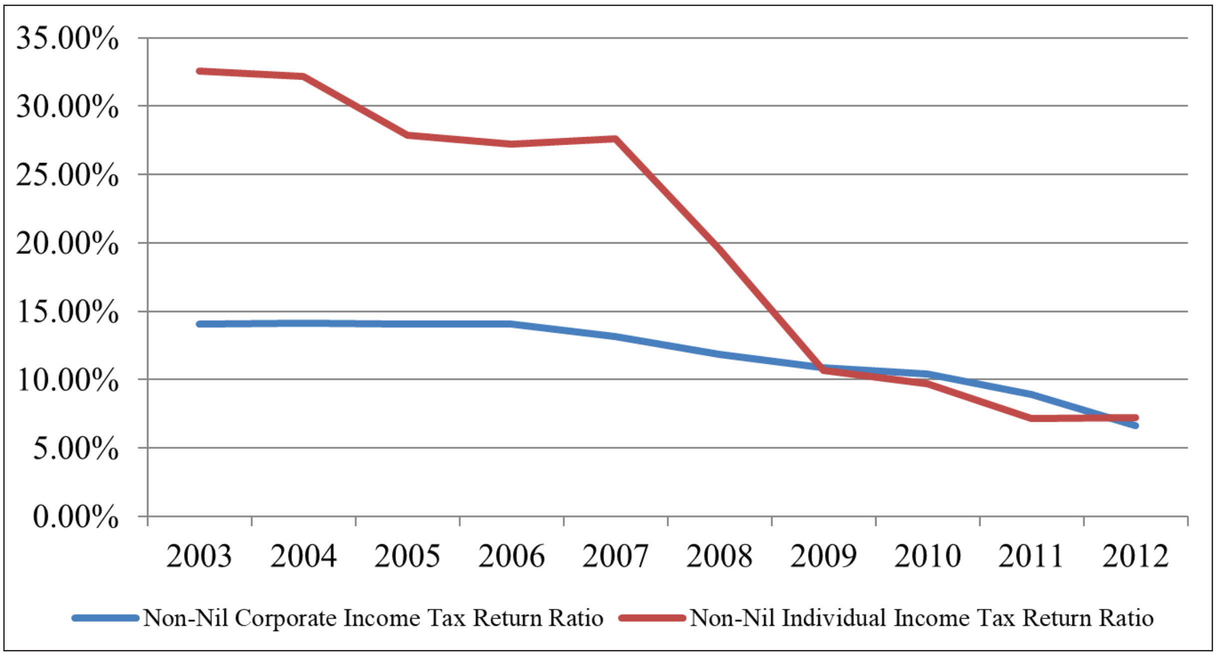

Figure 4. Non-nil income tax return ratio.

Source: The figure was based on data from the Directorate General of Taxes.
Note: Non-nil income tax ratio is a ratio of the number of income tax return with positive reported taxable income to the number of registered taxpayers.

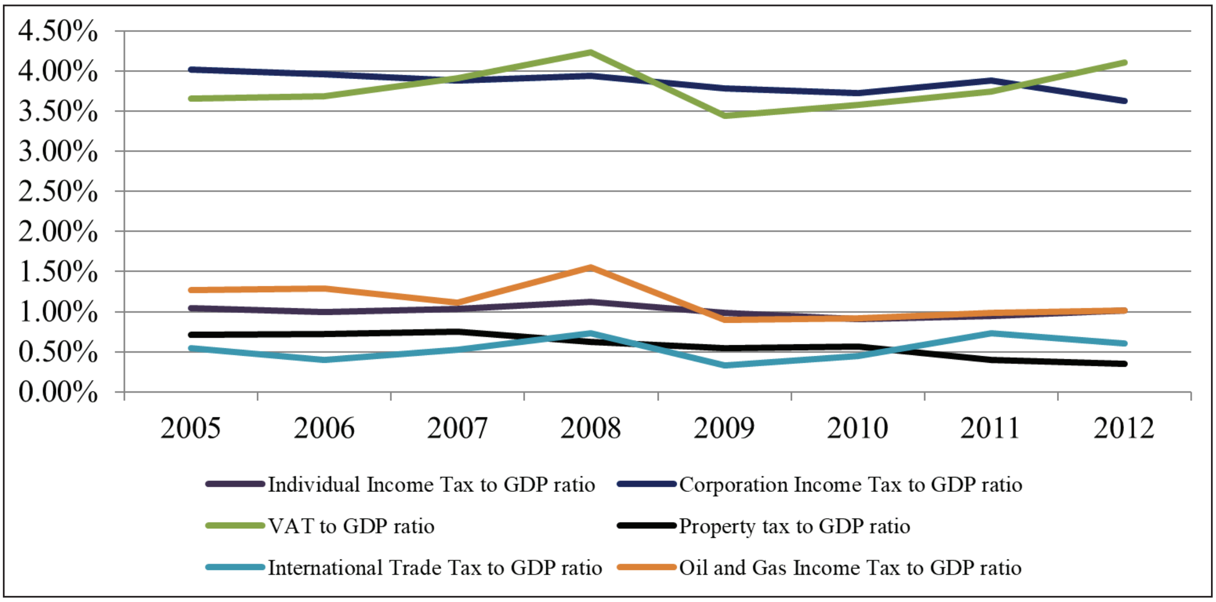

Figure 5. Tax to GDP ratio by type of taxes.

Source: The figure was based on data from Central Government Financial Statement (various publications).

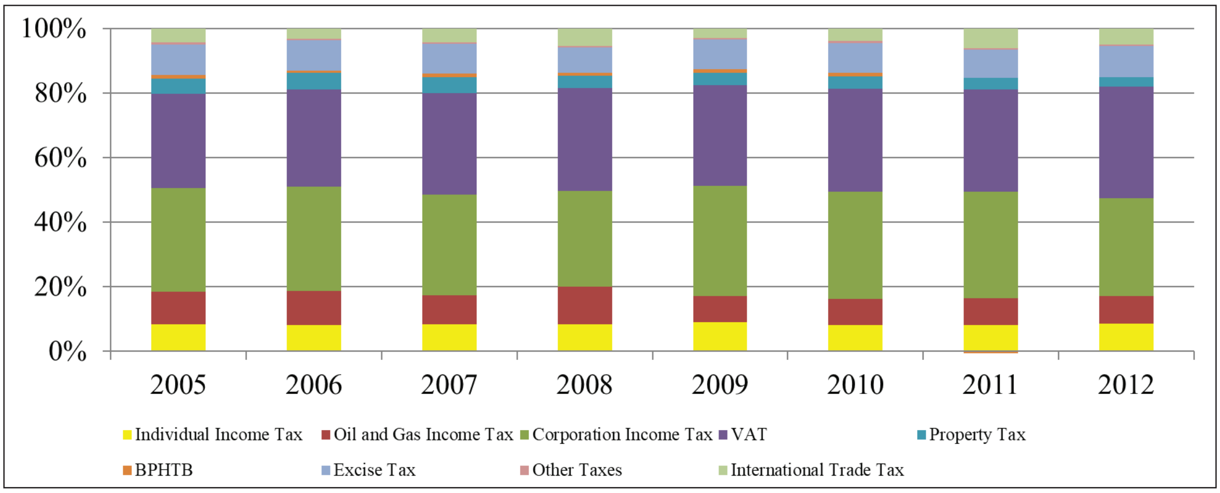

Figure 6. Composition of tax revenue by type of taxes.

Source: The figure was based on data from Central Government Financial Statement (various publications).

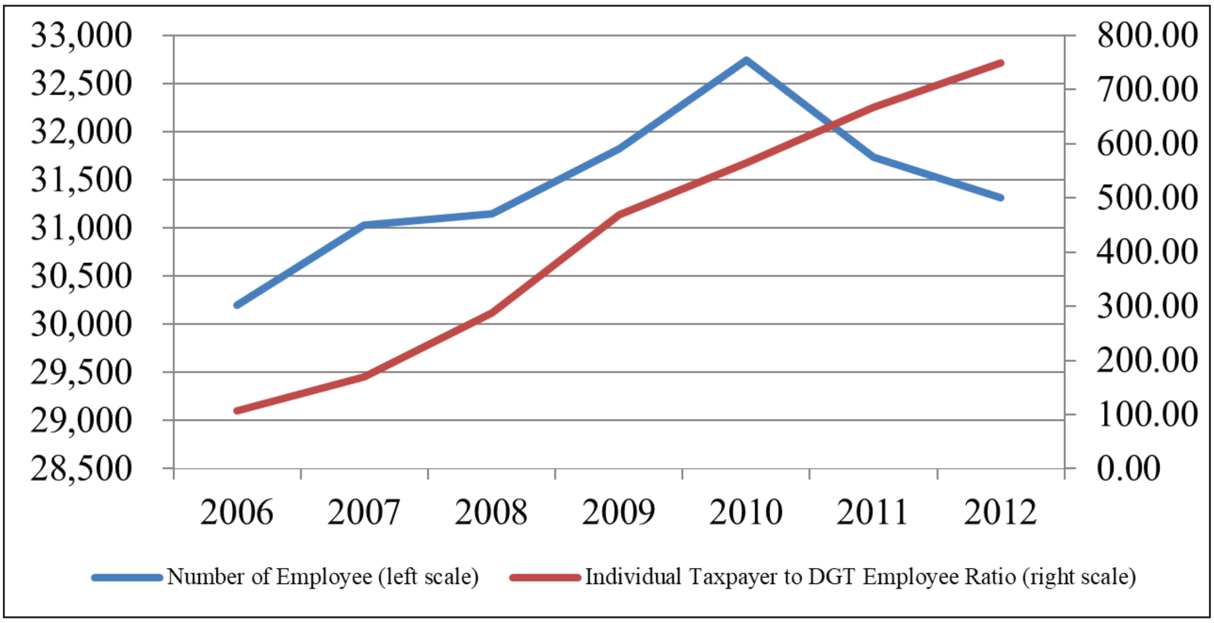

Figure 7. Number of DGT's employee and individual taxpayer to DGT's employee ratio.

Source: The figure was based on data from the Directorate General of Taxes.

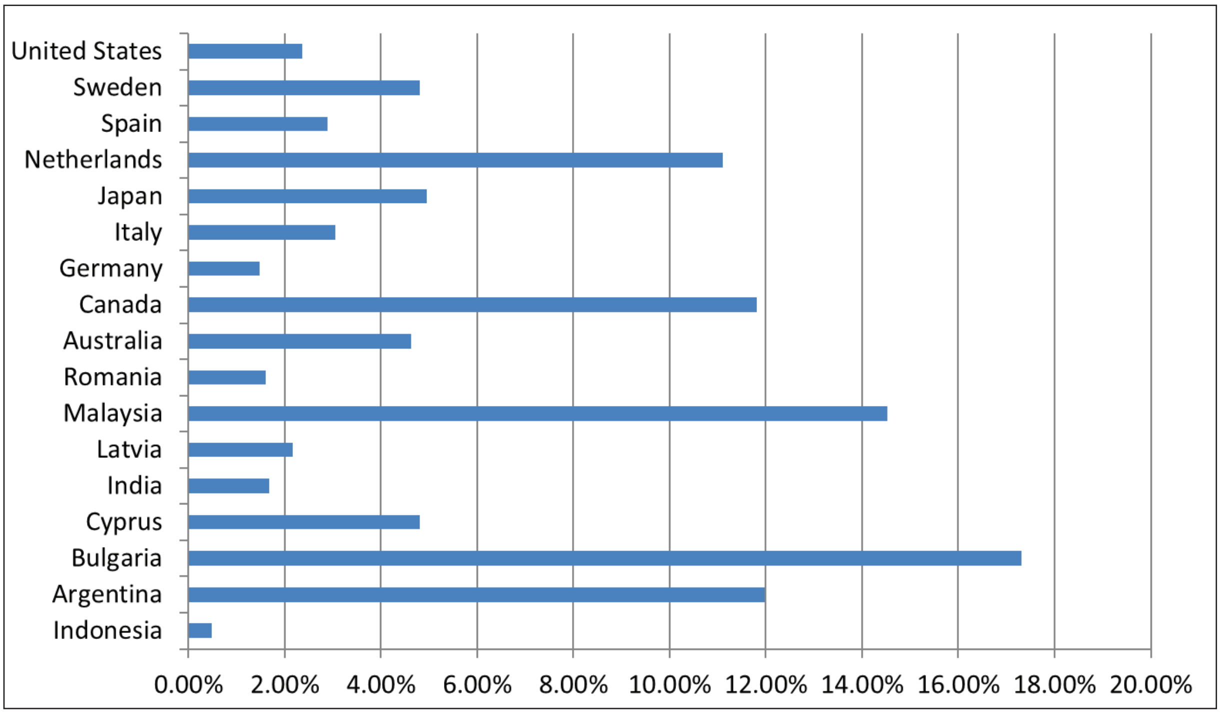

Figure 8. Audit coverage ratio for selected countries

Source: based on data from OECD (2010).

Note: data are for the year 2009. The ratio is calculated by dividing the number of completed verification (tax audit, assessment or similar enforcement mechanism) to the total number of registered taxpayers (individual and corporate taxpayer).

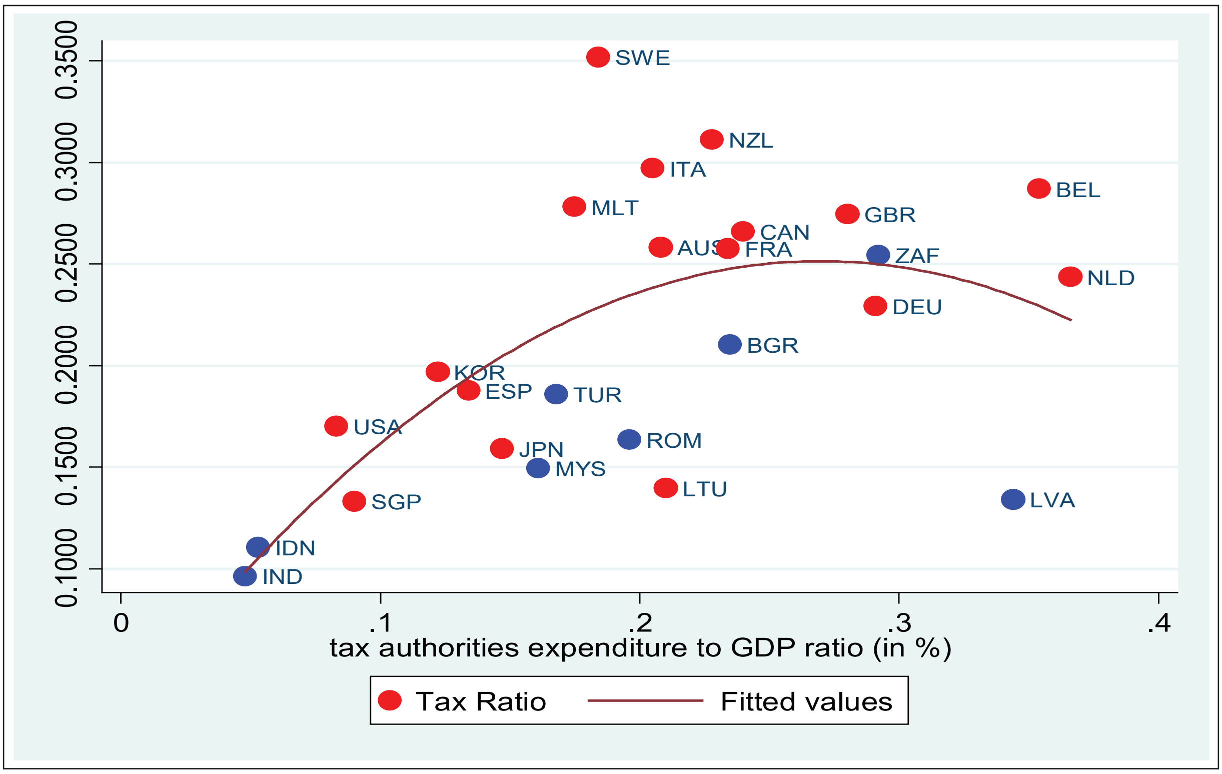

Figure 9. Tax ratio and tax administration expenditure to GDP Ratio

Source: based on data from OECD (2010).

Note: data are for the year 2009. Blue color represents middle income countries, and red color represents high income countries.